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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/728,970	12/08/2003	Kia Silverbrook	MTB07US	9050

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SILVERBROOK RESEARCH PTY LTD
393 DARLING STREET
BALMAIN, 2041
AUSTRALIA

EXAMINER	
LEBRON, JANNELLE M	
ART UNIT	PAPER NUMBER
2861	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/728,970	SILVERBROOK, KIA	
	Examiner	Art Unit	
	Jannelle M. Lebron	2861	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *22 March 2007*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-13 and 15-36* is/are pending in the application.

4a) Of the above claim(s) *8-12,20-24 and 32-36* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-7,13,15-19 and 25-31* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *30 October 2006* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Claim Objections

1. Claim 1 is objected to because of the following informalities: the limitation "said drive circuitry" in line 5 lacks antecedent basis. Appropriate correction is required.

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

3. Claims 1-7, 13, 15-19 and 25-31 are rejected under 35 U.S.C. 103(a) as being unpatentable over Torpey (US Patent 5,801,727) in view of Silverbrook (US 6,243,113).

4. Regarding claim 1, Torpey discloses:

an inkjet printhead (48 in figure 5 comprising a multi-layer substrate (col. 4, lines 25-30; as seen in figs. 4 and 5), said multi-layer substrate comprising:

a silicon substrate (col. 4, lines 25-30);

a passivation layer (passivation layers are often made of silicon and thus the silicon substrate in the reference meets this limitation);

a plurality of nozzles mounted on said passivation layer (64 in fig. 5)

each nozzle comprising:

a chamber (16 in figure 2) adapted to contain an ejectable liquid (ink 21 in figure 2); and,

at least one droplet ejection actuator (80 in figure 5) associated with each of the chambers respectively, the droplet ejection actuator being adapted to eject a droplet of the ejectable liquid from the nozzle (column 4, lines 41-44), wherein,

the chambers are at least partially formed by an amorphous ceramic material (column 3, lines 47-52).

Even though Torpey discloses a passivation layer that covers layers and circuitry located below it, it does not disclose the following:

drive transistors and CMOS interconnect layers formed on said silicon substrate;

a passivation layer covering said drive circuitry and CMOS interconnect layers; and

the droplet ejection actuator being electrically connected to a respective drive transistor.

Silverbrook discloses a multi-layer substrate comprising a silicon substrate (27 in fig. 4), a drive transistor (col.11, lines 48-49) and CMOS interconnect layers (26 in fig. 4) formed on said silicon substrate (col. 9, lines 7-9), a passivation layer (silicon substrate 27), a plurality of nozzles mounted on said passivation layer (28 in fig. 5) and a droplet actuator (22 and 25 in fig. 4) that is electrically connected to a respective drive transistor.

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to modify the Torpey invention to include drive transistors and CMOS layers and an actuator connected to a respective transistor as taught by Silverbrook for the purpose of providing an efficient ink ejection nozzle arrangement for an inkjet printhead and obtain improved printing quality.

5. Torpey et al. further discloses:

- Claim 2:

wherein the drop ejection actuator (80 in figure 5) is a heater element configured for thermal contact with a bubble forming liquid within the chamber (column 4, lines 35-37); such that,

heating the heater element (80) to a temperature above the boiling point of the bubble forming liquid forms a gas bubble (92 in figure 5) that causes the ejection of a droplet of the ejectable liquid through the nozzle corresponding to that heater element (column 4, lines 41-44).

- Claim 6:

wherein the ejectable liquid is the same as the bubble forming liquid (column 4, lines 41-44).

- Claim 7:

wherein the printhead is a pagewidth printhead (column 4, lines 23-24).

6. Regarding claim 13, Torpey et al. discloses

a printer system which incorporates a inkjet printhead, the printhead comprising a multi-layer substrate comprised of:

a silicon substrate (col. 4, lines 25-30);

a passivation layer (passivation layers are often made of silicon and thus the silicon substrate in the reference meets this limitation);

a plurality of nozzles mounted on said passivation layer (64 in fig. 5)

each nozzle comprising:

a bubble forming chamber (16 in figure 2) adapted to contain a bubble forming liquid (ink 21 in figure 2); and,

at least one heater element (80 in figure 5) disposed in each of the bubble forming chambers respectively, the heater elements configured for thermal contact with the bubble forming liquid (as seen in figure 5); such that,

heating the heater element (80) to a temperature above the boiling point of the bubble forming liquid forms a gas bubble (92 in figure 5) that causes the ejection of a drop of an ejectable liquid from the nozzle corresponding to that heater element (column 4, lines 41-44),

wherein the bubble forming chambers are formed of an amorphous ceramic material (column 3, lines 47-52).

Even though Torpey discloses a passivation layer that covers layers and circuitry located below it, it does not disclose the following:

drive transistors and CMOS interconnect layers formed on said silicon substrate;

a passivation layer covering said drive circuitry and CMOS interconnect layers; and

the droplet ejection actuator being electrically connected to a respective drive transistor.

Silverbrook discloses a multi-layer substrate comprising a silicon substrate (27 in fig. 4), a drive transistor (col.11, lines 48-49) and CMOS interconnect layers (26 in fig. 4) formed on said silicon substrate (col. 9, lines 7-9), a passivation layer (silicon substrate 27), a plurality of nozzles mounted on said passivation layer (28 in fig. 5) and a droplet actuator (22 and 25 in fig. 4) that is electrically connected to a respective drive transistor.

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to modify the Torpey invention to include drive transistors and CMOS layers and an actuator connected to a respective transistor as taught by Silverbrook for the purpose of providing an efficient ink ejection nozzle arrangement for an inkjet printhead and obtain improved printing quality.

7. Torpey further discloses:

- Claim 18:

wherein the ejectable liquid is the same as the bubble forming liquid (column 4, lines 41-44).

- Claim 19:

wherein the printhead is a pagewidth printhead (column 4, lines 23-24).

8. Regarding claim 25, Torpey et al. discloses

a method of ejecting drops of an ejectable liquid from an inkjet printhead (48 in figure 5), the printhead comprising a multi-layer substrate (as seen in fig. 5) comprised of:

a silicon substrate (col. 4, lines 25-30);

a passivation layer (passivation layers are often made of silicon and thus the silicon substrate in the reference meets this limitation);

a plurality of nozzles mounted on said passivation layer (64 in fig. 5)

each nozzle comprising:

a chamber (16 in figure 2) corresponding to each of the nozzles respectively (column 4, lines 25-27), the chambers adapted to contain an ejectable liquid (ink 21 in figure 2); and,

at least one droplet ejection actuator (80 in figure 5) associated with each of the chambers respectively,

wherein the chambers are at least partially formed of an amorphous ceramic material (column 3, lines 47-52);

the method comprising the steps of:

placing the ejectable liquid into contact with the drop ejection actuator; and

actuating the droplet ejection actuator such that a droplet of an ejectable liquid is ejected from the corresponding nozzle (column 4, lines 41-44).

Even though Torpey discloses a passivation layer that covers layers and circuitry located below it, it does not disclose the following:

drive transistors and CMOS interconnect layers formed on said silicon substrate;

a passivation layer covering said drive circuitry and CMOS interconnect layers; and

the droplet ejection actuator being electrically connected to a respective drive transistor.

Silverbrook discloses a multi-layer substrate comprising a silicon substrate (27 in fig. 4), a drive transistor (col.11, lines 48-49) and CMOS interconnect layers (26 in fig. 4) formed on said silicon substrate (col. 9, lines 7-9), a passivation layer (silicon substrate 27), a plurality of nozzles mounted on said passivation layer (28 in fig. 5) and a droplet actuator (22 and 25 in fig. 4) that is electrically connected to a respective drive transistor.

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to modify the Torpey invention to include drive transistors and CMOS layers and an actuator connected to a respective transistor as taught by Silverbrook for the purpose of providing an efficient ink ejection nozzle arrangement for an inkjet printhead and obtain improved printing quality.

9. Torpey further discloses:

- Claim 26:

wherein the drop ejection actuator (80 in figure 5) is a heater element configured for thermal contact with a bubble forming liquid within the chamber (column 4, lines 35-37); such that,

heating the heater element (80) to a temperature above the boiling point of the bubble forming liquid forms a gas bubble that causes the ejection of a droplet of the ejectable liquid through the nozzle corresponding to that heater element (column 4, lines 41-44).

- Claim 30:

  wherein the ejectable liquid is the same as the bubble forming liquid (column 4, lines 41-44).

- Claim 31:

  wherein the printhead is a pagewidth printhead (column 4, lines 23-24).

10. Regarding claims 3-5, 15-17, and 27-29, Torpey discloses substantially the claimed invention except for "wherein the amorphous ceramic material is silicon nitride", "wherein the amorphous ceramic material is silicon dioxide", and "wherein the amorphous ceramic material is silicon oxynitride." It has been held to be within the general skill of a worker in the art to select a known material on the basis of its suitability for the intended use as a matter of obvious design preference. *In re Leshin, 125 USPQ 416.* It would have been obvious to one having ordinary skill in the art at the time the invention was made to use these types of ceramics as the preferred material in order to lower cost and increase the durability of the printhead by using these well-known wear resistant materials to manufacture the chambers.

Response to Arguments

Applicant's arguments with respect to claims 1-36 have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Communication with the USPTO

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jannelle M. Lebron whose telephone number is (571) 272-2729. The examiner can normally be reached on Monday thru Friday 8:30am-5:00pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Matthew Luu can be reached on (571) 272-7663. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

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06/07/2007

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